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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,086	04/09/2002	Paul Zientek	322-00066	3078

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EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/019,086	ZIENTEK, PAUL	
	Examiner	Art Unit	
	Martin J. Angebranndt	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *5/4/05 & 6/3/05*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6--12,18,20,22,25-37 and 41-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6--12,18,20,22,25-37 and 41-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The response provided by the applicant has been read and given careful consideration. Responses to the arguments of the applicant are presented after the first rejection to which they seem most directed.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1,3,4,6-12,18,35-37 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. '857, in view of JP 11-064614 and GB 2222696.

Takeuchi et al. '857 teach translucent/transparent holograms having the various structures shown in the figures. The holographic enhancing layer may be any of a variety of materials including thin metal films, polymers and various pigment compositions (col 6-9.). The holograms forming layer may be a single or multilayered structure, such as a substrate provided with a resins film into which the hologram is formed. (4/35-42). Useful resins include

polycarbonate, polyesters and the like (4/61-6/64). The support may include a protective layer (13/5-21).

JP 11-064614 (machine translation attached) teaches the use of masked laser exposure to machine (ablate) grating patterns in the polymer film backed by the reflective layer. (See figures 5, 8, 6,9 and corresponding text [0029-0031, 0035], example 1 [0025-0026], and abstract). The use of a mask is disclosed as preferable to resist processing and the use of a mask obviates the need for the vibration control [0005-0008] The polymeric materials may be transparent or light absorbing [0011]. The polymeric materials which may be ablated includes PET, polycarbonate, polyimide resins and others [0039]. As polymeric materials generally absorb strongly in the UV, UV lasers are used. The use of multilayered polymeric films is also disclosed. [0043-0044].

GB 2222696 teaches excimer laser ablation to directly form a grating in a plastic substrate and described the coating of the grating with a reflective layer. (page 2). The use of polycarbonate, polyethylene terephthalate (PET and polyimide is disclosed. (page2)

It would have been obvious to one skill in the art to modify the processes of Takeuchi et al. '857 by using other known processes for forming holograms I the multilayered embodiments of the hologram forming layer, such as the direct laser ablation taught by JP 11-064614 using a mask with a reasonable expectation of forming a useful holographic object based upon the resins disclosed as useful by Takeuchi et al. '857 including polyesters (which PET is a type) and polycarbonate resins, which are disclosed by JP 11-064614 and GB 2222696 as amenable to laser patterning using UV lasers in the absence of pigmentation of the polymeric layer due to the strong absorption of polymers in the UV as discussed by JP 11-064614 and GB 2222696.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The applicant fails to appreciate Takeuchi et al. '857, which forms the holographic relief on the surface of a polymeric substrate, which may be a multilayered, in the manner shown in the third figure (2,45) from the top on page 6 of the figures of the instant specification. The polymeric materials are transparent and the diffraction without the coating is limited to that achieved due to the reflective index difference between the polymer (~1.5) and air (~1.0). This is amplified when the refractive index difference is greater and with Takeuchi et al. '857 is described as the hologram enhancing layer. As such the hologram enhancing layer is directly analogous to the reflective layer (47) applied to the relief surface (46) **after it has been formed** in the fourth figure on page 6 of the figures of the instant specification. The amenability of these materials to laser ablative patterning is clear from the disclosures of JP 11-064614 and GB 2222696 which describe the use of the same polymers and that polymers are absorbing in the UV, which allows them to be patterned by UV lasers. The term diffraction optical element includes common gratings, holograms and the like. Holograms inherently have projected images, but the claims are not limited to holograms, but embrace all diffractive patterns. The article provided by the applicant (which should have had a PTO-1449), while interesting bears little on the issues at hand as the claims are not limited to any particular type of diffractive article, further, there seems to be no mention of digital diffractive articles in the instant specification, so it is not clear how the applicant's position that these are explicitly contemplated is supportable. Similarly, the mask is not limited to any type of mask,

beyond that bearing the diffractive patterns. The applicant need not necessarily duplicate the text at multiple places in the response as, for example, on pages 8 and 19 of the response, where the only difference in the paraphrasing of 10-113780 is the "1" or "35". This occurs of the other references as well. This issue of the application of a transparent coating is addressed by the multilayered embodiment of Takeuchi et al. '857 as the materials are the same type of polymers susceptible to the same laser ablation, what is not of record is what unobvious difference exists when a bilayer system is used, rather than a single layer. The Takeuchi et al. '857 reference teach the application of thin metallic reflective layers as in table 5, transparent resins having a different refractive index from the relief bearing layer as in table 6, pigmentsed layers (11/40-12/13) and laminates thereof (9/40-41). Therefore the use of reflective and/or transparent layers provided over the relief bearing surface are old, well known and obvious. Further, the examiner notes that the claims do not describe the function of the transparent layer in the manner argued by the applicant ands therefore the claims are not commensurate in scope with the argued position.

5. Claims 1,3,4,6-12,18,35-37 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. '857, in view of JP 11-064614 and GB 2222696, further in view of JP 06-51683

JP 06-51683 teaches holograms allowing only a partial view, where the holographic layer is a polymeric resin and is coated in areas with a material (3) having the same reflective index as the polymeric resins, thereby hiding the hologram in those areas. Additionally, these may be hiding layers (5 and 1 on the side opposite the holographic relief as shown in figure 8. The base

materials may be a plastic [0013]. The metallization of the hologram is disclosed. [0021-0022]. This may be considered a translucent hologram.

In addition to the basis provided above, it would have been obvious to modify the invention of Takeuchi et al. '857 combined with JP 11-064614 and GB 2222696, by applying hologram obscuring areas as taught by JP 06-51683 to add a further dimension to the holographic/diffractive effect with a reasonable expectation of forming a useful holographic article. Further, figure 1, clearly shows the use of a transparent polymeric layer (2) provided on a substrate and serves to reinforce the obviousness of the multilayer embodiment of Taniguchi et al.

The examiner relies upon the basis provided above without further comment.

6. Claims 20,22,25-28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Savant et al. '221, in view of Okai et al. '637 and Chigrinov et al. '698.

Savant et al. '221 teach photochromic recording using azo dyes dispersed in polymers where holographic recording occurs. (4/55-66). This includes isomerization and crosslinking (4/67-5/7). Figure 3 evidenced the use of a reflective layer (lowest layer), which reflects the light back after passing through the substrate and recording layer. **Polarization recording** is specifically discussed and occurs as long as a polarized beam is used. (25/58-26/24). The use of a two beam exposure process is disclosed. with respect to example 1.

Okai et al. '637 teach the use of two beam exposure processes for forming gratings. (1/24-32). The use of a gratings mask exposure resulting in increased contrast (light/dark ratio) and accuracy (due to lack of vibrations) and larger gratings may be made. (1/44-59) see figures 4-14d.

Chigrinov et al. '698 teach the use of a photomask with a polarizer or two beam interference with linearly polarized light to form oriented molecular regions.

It would have been obvious to modify the process of Savant et al. '221 by using a mask exposure, rather than a two beam interferometric techniques based upon the disclosure of equivalence by Chigrinov et al. '698 and with a reasonable expectation of forming an improved grating image based upon the teachings of Okai et al. '637.

The applicant argues that only Chigrinov et al. '698 describes polarization recording, the examiner as boldfaced the citation of the teaching in Savant et al. '221. Polarization recording is due to the coincidence of the molecular dipole axis of the absorbing molecule and the electric field vector of the incident light. For plane polarized light (linear polarized light) exposing a group of randomly oriented molecules (as occurs in solution, polymeric films, etc) the light is absorbed only by about one third of the molecules. There are three irreducible orientations for molecules (intermediate orientations are sums of these), vertically (arrow up/down), horizontally (arrow left/right) and on axis (arrow on end, pointing away) and if the electric field of the light is oriented vertically, only the molecules with their molecular dipole (long axis) oriented vertically (or at least partially so) interact with the light, the other molecules ignore it as their orientation precludes the absorption of the light. So using polarized light inherently results in a polarization recording, although we cannot detect this visually without a polarizing element/filter as the eye cannot differentiate between the different polarizations. Savant et al., using a masking element to form the grating, which will result higher contrast and increased accuracy in the grating formed as discussed by Okai et al. '637, with the polarized laser Savant et al. discloses will inherently record polarization holograms and this position is supported by Chigrinov et al. '698

who clearly describes the use of two beam interference or masked exposure to form polarization recordings. The rejection stands.

7. Claims 20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grime, G.W., "holographic Diffraction Gratings Recorded in Photoresist. ", in "Non-silver Photographic Processes", in view of Okai et al. '637 and Chigrinov et al. '698.

Grime teaches the exposure of a photoresist using an Argon ion laser beam. This is a CW gas laser and the beam is polarized vertically due to the structure of the Argon ion laser. The resist is coated on a glass substrate and exposed to cause a solubility change, the resist is developed and coated with metal as shown in figure 5.

It would have been obvious to modify the process of Grime, G.W. by using a mask exposure, rather than a two beam interferometric techniques based upon the disclosure of equivalence by Chigrinov et al. '698 and with a reasonable expectation of forming an improved grating image based upon the teachings of Okai et al. '637.

The examiner relies upon the response above without further comment as no further arguments were directed at this rejection.

8. Claims 20,22 and 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al. '857, further in view of Grime, G.W., "holographic Diffraction Gratings Recorded in Photoresist. ", in "Non-silver Photographic Processes" combined with Okai et al. '637 and Chigrinov et al. '698.

It would have been obvious to one skill in the art to modify the processes of Takeuchi et al. '857 by using other known processes for forming holograms, such as the photoresist processing methods which are old and well known as established by Grime, G.W., "holographic

Diffraction Gratings Recorded in Photoresist. ", in "Non-silver Photographic Processes" as combined with Okai et al. '637 and Chigrinov et al. '698 above and to modify the process by laser ablation modification taught by DE 29805481 with a reasonable expectation of forming a useful holographic object.

The examiner relies upon the response above without further comment as no further arguments were directed at this rejection.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Martin J Angebranndt
Primary Examiner
Art Unit 1756

08/17/2005